Ongoing

Ways to Implement Net-Zero Whole Life Carbon Buildings

EBC ANNEX 89

Summary

IEA EBC Annex 89 focuses on the pathways and actions needed by various stakeholders and decision-makers to implement whole life cycle based net-zero greenhouse gas (GHG) emissions from buildings in policy and practice. This means explicitly considering both embodied and operational GHG emissions across all stages of the built asset life cycle – also referred to as whole life carbon (WLC) – to achieve the overarching (or ultimate) goal of the Paris Agreement, which is to limit global warming to well below 2° Celsius, and preferably to 1.5° Celsius, above pre-industrial levels by aiming to achieve climate neutrality by 2050 latest. In this document, policies, initiatives and actions that share, support and contribute to this goal are referred to as "Paris-goal compatible".

There is a critical and urgent need to effectively implement science-based targets, assessment methods, and solutions into policy and practice to enable a broad range of stakeholders and key decision-makers across the world to promote and support the delivery of Net Zero-WLC buildings at speed and at scale.

Objectives

1. Developing guidelines and recommendations on establishing whole life carbon targets (including carbon budgets) for the building and real estate sector at various scales and perspectives and identifying critical carbon reduction pathways and actions;
2. Establishing Paris-goal compatible assessment frameworks and evaluating the suitability and application(s) of different assessment methods to achieve NetZ-WLC buildings at various scales;
3. Mapping and assessing the relevance and effectiveness of a range of tools, aids and instruments available to different stakeholders in their decision-making contexts and objective(s);
4. Understanding the conditions that are conducive for in-practice uptake and more effective implementation of context-based solutions and actions by key stakeholders; and
5. Ensuring efficient and effective engagement and knowledge exchange with diverse stakeholder groups and disseminating results.

Figure 1. In-person IEA EBC Annex 89 3rd Expert Meeting November 2024 in Melbourne, Australia. Source: DBI24

Deliverables

D1. Report on guidelines and recommendations on establishing carbon reduction paths and actions towards NetZ-WLC buildings based on relevant contexts of countries and jurisdictions.

D2. Report on guidelines for selection and application of assessment methods to estimate and determine Paris-goal compatible NetZ-WLC status of buildings.

D3. Report on enabling tools and instruments to increase NetZ-WLC building implementation at national and regional (e.g., EU) level.

D4. Report on enabling and disabling factors for implementation of NetZ-WLC initiatives, and lessons learnt for transferring to different contexts.

Progress

Over the past year, IEA EBC Annex 89 has significantly advanced its collaborative research program by engaging a diverse network of international experts and stakeholders. The project progressed through structured bi-weekly coordination meetings that emphasized reporting progress, addressing challenges, and planning future activities. Continuous interaction across subtasks ensured enhanced synergy within Annex 89.

Annex 89 focused on developing comprehensive guidelines and frameworks to facilitate the implementation of net-zero whole-life carbon (NetZ-WLC) strategies. This effort included extensive literature reviews and policy analyses to align with global net-zero targets and carbon reduction strategies. Rich discussions during expert meetings and workshops helped refine methodologies and share best practices for lifecycle assessments, aiming to standardize approaches across different regulatory environments.

The annex also dedicated significant efforts to identifying and refining tools that enable the practical implementation of NetZ-WLC strategies. This included categorizing existing tools and developing new ones, supported by surveys and discussions to ensure their effectiveness and broader application.

In addition to technical advancements, Annex 89 emphasized dissemination and stakeholder engagement. It hosted international conferences and workshops, including significant events in Berlin and Melbourne, to discuss ongoing challenges and adjust strategies. These forums, such as WSBE 24 and DBI24, were instrumental in facilitating knowledge exchange among policymakers, industry leaders, and researchers, shaping the project's direction and enhancing its policy relevance.

Furthermore, Annex 89 strengthened its digital presence to reach a broader audience and maintain engagement with global stakeholders through a public website and a LinkedIn group. A highlight of the year was co-hosting a COP29 event in Baku, Azerbaijan, where Annex 89 leaders launched a global call to action to commit the built environment sector to net-zero whole-life carbon. This initiative underscored the critical role of the building sector in meeting the Paris Agreement's climate targets, attracting support from over 106 researchers and 25 stakeholders.

Overall, Annex 89's activities over the year have significantly contributed to the global dialogue and action towards achieving a sustainable and resilient built environment. The ongoing research and collaborative efforts within Annex 89 are expected to pave the way for innovative strategies that others can adopt towards sustainability.

Figure 2.Carlos E. Caballero-Güereca (in the representation of ST2), Maria Balouktsi (ST3 lead), Freja Rasmussen (ST4 lead), Alexander Passer (Operating Agent), Greg Foliente (ST1 lead), Thomas Lützkendorf (ST5 co-lead). Source: DBI24

Meetings

The following meetings were held in 2024:

- June 20-21: 2nd Expert Meeting, Berlin, DE.
- November 18-22: 3rd Expert Meeting, Melbourne, AU.

Project duration
2023 – 2027

Operating Agent(s)
Alexander Passer, Graz University of Technology, AT

Subtask Leaders
ST1: Greg Foliente, University of Melbourne (AU)
ST2: Marcella Saade, Graz University of Technology (AT), and Vanessa Gomes, University of Campinas (BR)
ST3: Maria Balouktsi, Aalborg University Copenhagen (DK) and Bernardette Soust-Verdaguer, Universidad de Sevilla (ES)
ST4: Freja Nygaard Rasmussen, NTNU (NO) and Alice Moncaster, Open University (UK)
ST5: Alexander Passer, Graz University of Technology (AT) with Thomas Lützkendorf, Karlsruhe Institute of Technology, (DE) and Rolf Frischknecht, treeze Ltd., (CH)

Participating countries
Australia, Austria, Belgium, Brazil, Canada, China, Czech Republic, Denmark, Finland, France, Germany, India, Ireland, Italy, Japan, Netherlands, New Zealand, Norway, Portugal, Singapore, Slovenia, South Corea, Spain, Sweden, Switzerland, Turkey, United Kingdom, United States of America
Observers: Egypt, Greece, Hungary

Further information
www.annex89.iea-ebc.org
https://www.linkedin.com/groups/7481268/
https://bit.ly/4gH4xC4
https://www.buildingsandcities.org/insights/commentaries/researchers-climate-policy-gaps.html